

What is claimed is:

1. An apparatus for collecting impurities on a semiconductor wafer, comprising:

an airtight process chamber;

a rotary chuck disposed in the process chamber for horizontally supporting the semiconductor wafer thereon and for rotating the semiconductor wafer;

a first scanning unit for forming a droplet of a first scanning solution and for scanning an upper surface of the semiconductor wafer rotated by the rotary chuck with the droplet of the first scanning solution to collect first impurities from the upper surface of the semiconductor wafer;

a first driving unit for tilting the rotary chuck to tilt the semiconductor wafer supported on the rotary chuck; and

a second scanning unit for receiving a second scanning solution in order to collect second impurities from an edge portion of the semiconductor wafer, the second scanning solution received in the second scanning unit being in contact with the edge portion of the semiconductor wafer tilted by the driving unit and rotated by the rotary chuck so that the second scanning solution scans the edge portion of the semiconductor wafer.

2. The apparatus as claimed in claim 1, further comprising a second driving unit for moving the rotary chuck in horizontal and vertical directions.

3. The apparatus as claimed in claim 1, wherein the first scanning unit comprises:

a scanning nozzle for forming the droplet of the first scanning solution; and

a scanning robot coupled to the scanning nozzle for horizontally moving the scanning nozzle so that the droplet of the first scanning solution scans the upper surface of the semiconductor wafer.

4. The apparatus as claimed in claim 3, wherein the scanning robot is a SCARA type robot.

5. The apparatus as claimed in claim 4, further comprising a circular hole for receiving the first scanning solution formed through the scanning nozzle; and

a coupling groove for coupling the scanning nozzle to a scanning arm of the scanning robot formed at an inner surface of the circular hole adjacent to an upper surface of the scanning nozzle.

6. The apparatus as claimed in claim 5, further comprising a concave portion formed at a lower surface of the scanning nozzle for making contact with the droplet of the first scanning solution.

7. The apparatus as claimed in claim 5, wherein the scanning arm comprises a coupling section coupled to the coupling groove, an air channel being in communication with the circular hole and for providing an air pressure in order to form the droplet of the first scanning solution that coheres to a lower surface of the nozzle, and a nozzle-removing section for removing the scanning nozzle from the coupling section.

8. The apparatus as claimed in claim 7, wherein the nozzle-removing section comprises:

- a second air channel for providing a second air pressure in order to remove the scanning nozzle from the coupling section;

- a rod disposed in the second air channel for removing the scanning nozzle;

- a piston connected to the rod for transmitting the second air pressure to the rod so that the rod protrudes outwardly from the second air channel and then pushes the scanning nozzle coupled with the coupling section; and

- a return spring for returning the rod protruded by the second air pressure.

9. The apparatus as claimed in claim 7, further comprising:

- a nozzle tray for supporting a plurality of scanning nozzles; and

- a storage container for storing the first scanning solution.

10. The apparatus as claimed in claim 3, further comprising:
a plurality of sampling cups for receiving the first scanning solution containing the first impurities; and
a sampling cup tray for supporting the plurality of sampling cups.

11. The apparatus as claimed in claim 1, wherein the second scanning unit comprises:
a plurality of scanning containers for receiving the second scanning solution;
a scanning container tray for supporting the plurality of scanning containers, the scanning container tray having a disc shape, and the plurality of scanning containers being circumferentially disposed along an edge portion of the scanning container tray; and
a second driving unit for rotating the scanning container tray.

12. The apparatus as claimed in claim 11, wherein each of the plurality of scanning containers has a scanning groove, and a bottom surface of the scanning groove is a curved surface corresponding to the edge portion of the semiconductor wafer.

13. The apparatus as claimed in claim 1, wherein the second scanning unit comprises:
a plurality of scanning containers for receiving the second scanning solution;

a scanning container tray for supporting the plurality of scanning containers;

a scanning container stage disposed under the semiconductor wafer tilted by the driving unit for supporting one of the scanning containers; and

a transfer robot for transferring the scanning containers between the scanning container tray and the scanning container stage.

14. The apparatus as claimed in claim 1, further comprising:

a load cassette disposed in the process chamber for receiving a plurality of semiconductor wafers to be subjected to an impurity collection process; and

an unload cassette disposed in the process chamber for receiving the plurality of semiconductor wafers subjected to the impurity collection process.

15. The apparatus as claimed in claim 14, further comprising a vapor phase decomposition unit for removing an oxide layer or a nitride layer formed on the semiconductor wafer using a hydrofluoric acid vapor.

16. The apparatus as claimed in claim 15, wherein the vapor phase decomposition unit comprises:

an airtight container capable of opening and closing in which the hydrofluoric acid vapor is supplied; and

a load plate disposed in the airtight container for supporting the semiconductor wafer.

17. The apparatus as claimed in claim 16, further comprising a transfer robot for transferring the semiconductor wafer among the load cassette, the vapor phase decomposition unit, the rotary chuck and the unload cassette.

18. The apparatus as claimed in claim 1, further comprising an aligner for aligning a center of the semiconductor wafer supported on the rotary chuck with a central axis of the rotary chuck, wherein the aligner includes:

a plurality of alignment pins for simultaneously moving horizontally toward the central axis of the rotary chuck so that the center of the semiconductor wafer is aligned with the central axis of the rotary chuck; and

a second driving unit disposed over the rotary chuck for moving the plurality of alignment pins in horizontal and vertical directions.

19. The apparatus as claimed in claim 1, wherein the first and second scanning solutions include H_2O , H_2O_2 and HF.

20. A method for collecting impurities on a semiconductor wafer comprising:

rotating the semiconductor wafer;

scanning an upper surface of the semiconductor wafer with a droplet of a first scanning solution in order to collect first impurities from the upper surface of the semiconductor wafer;

receiving the first scanning solution containing the first impurities into a sampling cup;

tilting the semiconductor wafer so that an edge portion of the semiconductor wafer is in contact with a second scanning solution received in a scanning container; and

rotating the tilted semiconductor wafer in order to collect second impurities from the edge portion of the semiconductor wafer.